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Signed R. Mahoney

Dated 24 February 2003

Patents Form 1/77

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

09 AUG 2002

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference — **84595/12479/05**

2. Patent application number *(The Patent office will fill in this part)* — **0218505.6**

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

EASTMAN KODAK COMPANY
343 STATE STREET
ROCHESTER
NEW YORK 14650-2201
UNITED STATES OF AMERICA

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation — **NEW JERSEY**

4. Title of the invention — **INKJET RECORDING MEDIUM**

5. Name of your agent *(if you have one)* — **A FREEMAN**

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

KODAK LIMITED
PATENTS, W92-3A
HEADSTONE DRIVE
HARROW
MIDDLESEX HA1 4TY

Patents ADP number *(if you know it)*

6. If you are declaring priority from one or more earlier patent applications, give the country and date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of Filing (day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing (day / month / year)

8. Is a statement of inventorship and of right to grant a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

c) any named applicant is a corporate body.

See note (d))

YES

INKJET RECORDING MEDIUM

FIELD OF THE INVENTION

The present invention relates to an inkjet recording medium (receiver).

BACKGROUND OF THE INVENTION

Inkjet printing is a process in which a stream of ink, preferably in the form of droplets, is ejected at high speed from nozzles against a medium so as to create an image.

Media used for inkjet recording need to be dimensionally stable, absorptive of ink, capable of providing a fixed image and compatible with the imaging materials and hardware.

Most commercial photo-quality inkjet media can be classified in one of two categories according to whether the principal component material forms a layer that is porous or non-porous in nature. Inkjet media having a porous layer are typically formed of inorganic materials with a polymeric binder. When ink is applied to the medium it is absorbed into the porous layer by capillary action. The ink is absorbed very quickly, but the open nature of the porous layer can contribute to instability of printed images, particularly when the images are exposed to environmental gases such as ozone.

Inkjet media having a non-porous layer are typically formed of one or more polymeric layers that swell and absorb applied ink. However, due to limitations of the swelling mechanism, this type of media is slow to absorb the ink, but once dry, printed images are often stable when subjected to light and ozone.

Japanese Patent application number 2001162924 in the name of Dainippon Ink and Chemicals, discloses an ink receiving layer comprising a porous receiver in which the pores are filled with a hydrophilic polymer. The pores are formed by irradiation of the receiver.

United States Patent application number US2001/0021726 in the name of James F Brown relates to the use of a porous resinous material for retaining biological samples.

Figure 1 is a schematic representation of a section through an inkjet medium according to the present invention;

Figure 2 is a schematic representation of a section through a conventional non-porous inkjet medium;

Figure 3 is a scanning electron micrograph through an inkjet medium according to the present invention; and,

Figure 4 is a scanning electron micrograph through a conventional non-porous inkjet medium;

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a schematic representation of a section through an inkjet medium according to the present invention. The medium 2 comprises a support layer 6, such as resin-coated paper, PET film base, acetate, printing plate or any other suitable support and a polymeric layer 4 of porous hydrophilic polymer supported thereon.

In most cases the hydrophilic polymer will be swellable. However, it is possible that an amount of crosslinker such as borax, tetraethyl orthosilicate, 2,3-dihydroxy-1,4-dioxane (DHD) or any other suitable crosslinker may be added to the polymer to provide an amount of crosslinking to the polymeric layer 4. Any suitable hydrophilic polymer may be used in the porous hydrophilic polymer layer including, amongst others, polyvinyl alcohol (PVA), polyethylene oxide (PEO), polyvinyl pyrrolidone (PVP) and gelatin.

Figure 2 shows a schematic representation of a section through a conventional non-porous inkjet medium. In this case a non-porous polymeric layer 8 is supported on the support layer 6.

A surfactant such as Olin 10G may also be added to the hydrophilic polymer used in the porous hydrophilic polymeric layer 6 and serves as a coating aid. Examples of other suitable surfactants include Lodyne S100, Zonyl FSN or any other flouro-surfactant.

One possible method for making the material relies on the coating of a support with a solution comprising a hydrophilic polymer and a blowing agent,

of 6.8 g/m^2 of PVA, 1.92 g/m^2 of sodium nitrite, 1.48 g/m^2 of ammonium chloride and 0.424 g/m^2 of Olin 10G surfactant. The top ink-receiving layer consisted of 7.5 g/m^2 of PVA, 2.11 g/m^2 of sodium nitrite, 1.64 g/m^2 of ammonium chloride and 0.636 g/m^2 of Olin 10G surfactant.

For comparison, a control coating was also prepared at the same time where the layers were identical to those described above, except the blowing agents (sodium nitrite and ammonium chloride) were omitted.

To initiate the blowing process, the dryers inside the coating track were set to 90°C through which the coated supports (used in the preparation of the medium according to the present invention and the control) were passed. As shown schematically in Figure 1, the blowing agents have reacted due to the heat in the dryers causing voids to form and resulting in a foamed polymeric layer. This can be compared to the control coating, shown schematically in Figure 2, where no voids can be seen.

Drytime and image stability were then compared for these two coatings. As an additional comparison, data for a commercially available porous medium (Epson Photo Glossy Paper) is also shown.

Drytime was evaluated by measuring the density of ink transferred to a piece of plain paper sandwiched to a printed image immediately after printing. The faster the sample dries the lower the ink density on the plain paper.

The following Printer set-up was used:

Printer:

Epson Stylus Photo 870

Printer Settings:

Print quality – photo 1440 dpi

Premium Glossy Photo Paper

The results in table 1 show the density of ink transferred during the drytime test.

Table 2: Light stability data

The following Printer set-up was used:

Printer:

Epson Stylus Photo 870

Printer Settings:

Print quality – photo 1440 dpi

Premium Glossy Photo Paper

The data in table 2 show that for the colours measured, the light stability of an image printed onto the foamed polymer medium is as good as that achieved from the PVA control and also shows a significant improvement over the light stability exhibited by a commercially available porous medium (Epson Glossy Photo Paper).

The ozone stability of the respective media were then assessed by printing an image, measuring the densities of the various colours (choosing a patch that has the density closest to 1.0) and then subjecting it to ozone (1ppm) for a period of 24 hours. The same colour patches were then measured again at the end of the 24 hour period and the loss of density calculated.

The ozone stability data are shown in table 3.

Ctg		Cyan	Magenta	Black
Foamed Polymer Medium	Fresh	1.021	0.916	0.921
	After 24Hrs	1.085	0.909	0.958
	Delta	**+6.3%**	**-0.8%**	**+4.0%**
PVA Control	Fresh	0.986	1.018	1.057
	After 24Hrs	0.953	1.022	1.053
	Delta	**-3.4%**	**+0.4%**	**-0.4%**
Epson	Fresh	0.931	1.082	0.811

CLAIMS:

1. An inkjet recording medium, comprising:
a support; and,
an ink receiving layer supported on said support, said ink receiving layer comprising a porous hydrophilic polymer.

2. A medium according to claim 1, in which the porous hydrophilic polymer is swellable.

3. A medium according to claim 1, in which said ink receiving layer includes a crosslinker.

4. A medium according to claim 1, in which said ink receiving layer includes a surfactant.

5. A medium according to claim 1, in which the porous hydrophilic polymer includes at least one polymer selected from the group consisting of polyvinyl alcohol, polyethylene oxide, polyvinyl pyrrolidone and gelatin.

6. A medium according to claim 1, in which the support is made of a material selected from the group consisting of resin-coated paper, PET, acetate and printing plate.

7. A medium according to claim 4, in which the surfactant is a flouro-surfactant.

8. A medium according to claim 7, in which the surfactant is selected from the group consisting of OLIN 10G, Lodyne S100 and Zonyl FSN.

9. A medium according to claim 4, in which the proportion by weight of surfactant to coating solution used in the preparation of the medium is in an amount from about 0.01% to about 2.0%, preferably, about 0.01% to about 1.0%.

ABSTRACT

The invention provides an inkjet recording medium, comprising a support and an ink receiving layer supported on the support. The ink receiving layer comprising a porous hydrophilic polymer.

[Fig. 1]

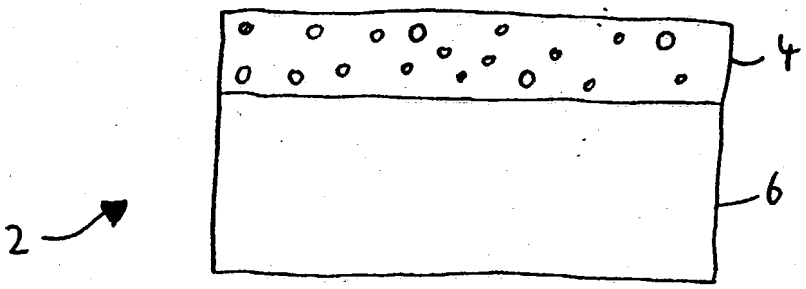

Fig. 1

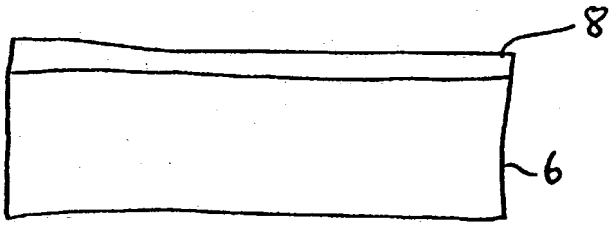

Fig. 2

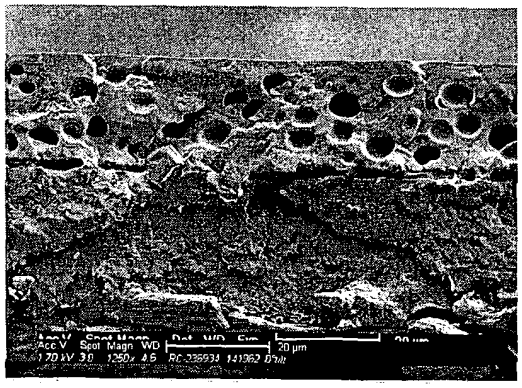

Fig. 3

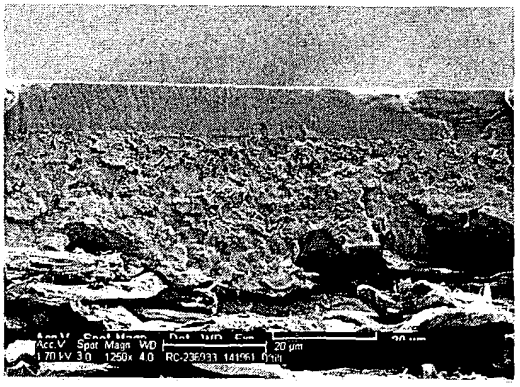

Fig. 4